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Biology 5380-001

R Project

**Methods:**

The data used in this project came from a long term study of desert animals in the Chihuahuan Desert near Portal, Arizona. (Morgan, 2009). Data was parsed using dplyr (Wickham, 2015) and graphs were generated with ggplot2, (Wickham, 2009). An ANOVA statistical test using stats, (R Core Team, 2015) was run to determine if there was a significant relationship between the hindfoot length and weight of the desert animals monitored. The script can be found at <https://github.com/sflynn2/surveyProject/blob/master/Survey.R> .

**Results:**

**Figure One:**

In figure one, the relationship between weight and the hind foot length were explored. After averaging the weight and hindfoot measurements and grouping by species, a scatter plot was used to visualize the data. The scatter plot showed a fairly linear relationship between weight and hindfoot length with only a few outliers. In other words, the heavier the animal, the larger the hindfoot length. It also highlighted the fact, that the majority of animals studied were below 100 grams. In order to further demonstrate that the relationship between the weight and hindfoot length are linked, an ANOVA statistical test was run on the data. The ANOVA test demonstrated there is a direct relationship between weight and hindfoot length, with an F value of 26,995 and a Pr (>F) = <2e-16.

**Figure Two:**

In figure two, the average weight was compared over time and visualized in a line graph. The data showed that between 1977 and 2002, the average weight of the animals peaked around 68g in 1978 and then continually declined until it reached its lowest point of 27g in 1986. Between 1986 and 2002, there average weight made a slight increase to 37g. This may indicate a reduction in population numbers of larger animals due to environmental changes in the desert ecosystem being studied.

**Figure Three:**

In figure three, the weight distribution in the male populations was looked at and a distribution curve was created. The distribution curve demonstrated that although the distribution ranged from 5-6 grams to over 275 grams, the majority of males were in the 40-50 gram range. There were three peaks in the distribution curve: one at approximately 10 grams, one at approximately 23 grams and the other at approximately 45 grams. Numbers dramatically fell above the 60 gram range. This was not surprising considering the data from figure two which shows that the average weight was below fifty grams for the majority of this study.

**Figure Four:**

Figure four was create to better view the results of the weight distribution under 100 grams.

**Figure Five:**

Figure five was created as a challenge by Dr. Hertweck. It shows a series of graphs showing the distribution of weight in males by species. This further illustrates that the majority of species captured in this study were below 50g in weight.

Literature Cited

S. K. Morgan Ernest, Thomas J. Valone, and James H. Brown. 2009. Long-term monitoring and experimental manipulation of a Chihuahuan Desert ecosystem near Portal, Arizona, USA. Ecology 90:1708.

Wickham, Hadley and Romain, Francois. 2015. dplyr: A Grammar of Data: Manipulation. R package version 0.4.3. http://CRAN.R-project.org/package=dplyr

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R Core Team. 2015. R: A language and environment for statistical computing R. Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.